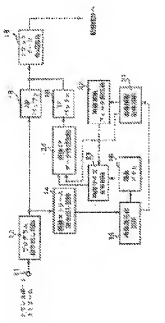
SPECIAL REPRODUCTION DATA GENERATING APPARATUS

Publication number: JP2003037818 (A)
Publication date: 2003-02-07
Inventor(s): FUJIWARA MITSUAKI; GOTO MASAKI
Applicant(s): VICTOR COMPANY OF JAPAN
Classification:
- international: ***G11B20/10; G11B20/12; G11B27/00; G11B27/02; G11B27/029; G11B27/032; G11B27/036; G11B27/32; H04N5/783; H04N5/92; H04N7/32;*** **G11B20/10; G11B20/12; G11B27/00; G11B27/02; G11B27/022; G11B27/031; G11B27/32; H04N5/783; H04N5/92; H04N7/32;** (IPC1-7): G11B20/10; G11B20/12; G11B27/00; G11B27/032; H04N5/783; H04N5/92; H04N7/32
- European:
Application number: JP20010226476 20010726
Priority number(s): JP20010226476 20010726

Abstract of **JP 2003037818 (A)**

PROBLEM TO BE SOLVED: To solve the problem in a conventional technique that image quality is remarkably degraded because the amount of special reproduction data is far smaller than the amount of usual reproduction data, and that it is difficult to retrieve a scene if an image update ratio is lowered for better image quality. SOLUTION: Image data of a specified program stored in an image memory 16 is converted in image size in an image size converting circuit 23, by using a filter coefficient from an image conversion filter setting device 22. An image TP data forming circuit 24 codes the input image data after image size conversion. Also, when the input image data is an interlace image, the circuit 24 outputs an image coding stream formed by synthesizing N (N being an integer not less than one) of a half-field I-picture, one-field P-picture and one-frame P-picture in time series. Further, the input image data is a progressive image, the circuit 24 outputs an image coding stream formed by synthesizing one-frame P-picture with N pieces of P-pictures in time series.



TECHNICAL FIELD

[Field of the Invention]In the digital signal recording and reproducing device which this invention requires for the data creation device for special reproduction, especially carries out record reproduction of the MPEG 2 (Moving Picture Experts Group 2) data which is the International Standard of an image compression system to recording media, such as magnetic tape, It is related with the data creation device for special reproduction which creates the data for special reproduction for recording the data for special reproduction reproduced at a different speed from the time of record.

[Translation done.]

* NOTICES *

JPO and INPIT are not responsible for any
damages caused by the use of this translation.

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]

[Field of the Invention]In the digital signal recording and reproducing device which this invention requires for the data creation device for special reproduction, especially carries out record reproduction of the MPEG 2 (Moving Picture Experts Group 2) data which is the International Standard of an image compression system to recording media, such as magnetic tape, It is related with the data creation device for special reproduction which creates the data for special reproduction for recording the data for special reproduction reproduced at a different speed from the time of record.

[0002]

[Description of the Prior Art]In the digital signal recording and reproducing device which records a digital information signal on recording media, such as magnetic tape, and is played, the digital information signal which carried out compression encoding of the information signal by MPEG 2 is recorded, and it plays. The coding by MPEG 2 has adopted motion compensation prediction, DCT (discrete cosine) conversion, and entropy code modulation here as known well, and coding data is transmitted in the frame unit called a picture.

[0003]The above-mentioned picture is classified into three kinds, I picture, P picture, and B picture. I picture is a frame inner code-ized picture coded in the same order as an original image.

It can reconstruct on one frame by I picture independent.

P picture is an inter-frame forward direction prediction-coding picture predicted from previous I picture or P picture in time. B picture is an inter-frame bidirectional prediction-coding picture predicted from I picture or P picture of after and the point in time.

[0004]Three kinds of above-mentioned pictures are put together appropriately, constitute GOP (Group of Picture) and are transmitted. Here, GOP is a unit of random access, as shown in drawing 4, I picture of one sheet is contained in 1GOP, and it begins from I picture, and B picture of two sheets is inserted between I picture or P picture into 1GOP. The arrow of the figure shows the direction of prediction. Since the data of the frame (picture) which becomes a basis of those prediction is required in order to reconstruct P picture and B picture, P picture and B picture cannot be reconstructed independently. Since the amount of coding data of each picture is not immobilization, the position on the tape to record and the position of a picture are not constant.

[0005]Here, only the coding mode of I picture is briefly explained with the block diagram of an example of the coding equipment of drawing 5. The discrete cosine transform (DCT:Discrete Cosine Transform) of the inputted original image is carried out by DCT section 1 of drawing 5, and it is sent to the quantizer 2. According to the value of a quantizing scale, it is quantized with the quantizer 2, and the coefficient by which DCT transformation was carried out is sent to the variable-length-coding (VLC:Variable Length Coding) machine 3. Among the DCT coefficients by which the VLC machine 3 was quantized, the high thing of appearing probability is performing variable length coding which assigns numerals with a low long thing of appearing probability for short numerals, and generates and outputs the compressed data which reduced statistical relative redundancy.

[0006]Next, the format (HD digital VCR conference standard) at the time of recording the above compressed data (MPEG data) on digital VCR (DVCR:Digital Video Cassette Recorder) is explained briefly.

[0007]Drawing 6 shows the recording format of this HD digital VCR conference standard. With VCR which performs record reproduction of a digital signal by a rotary head in the figure to the cassette type magnetic tape it runs. Each track with which the longitudinal direction inclined to the tape running direction is formed on magnetic tape, and each of that track comprises ITI area which consists of

insertion information and track information, a voice data area and an image data area, and a sub-code data area. The data of a sound, a picture, etc. is recorded by a sync block unit. However, MPEG data is recorded only on an image data area.

[0008]An image data area is divided into the data area (NPA) for ordinary reproduction, and data areas (tPA) for special reproduction, such as fast reproduction, like drawing 7. Why NPA and tPA are divided is explained. When there is no tPA, the data for ordinary reproduction is altogether recorded on an image data area. When it reproduces with different relative velocity between tape heads from the time of record for demands, such as fast forwarding reproduction, a rotary head will run ranging over two or more recording tracks, and it becomes impossible in this case, to gain MPEG data selectively naturally.

[0009]Since MPEG data cannot be reconstructed as above-mentioned if each data of P picture and B picture is independent, in the case of the above-mentioned special reproduction, a special reproduction image will be acquired only using I picture which can be decoded independently, but. Since the data of I picture played is not continuing on a screen, and is fragmentary data, it is moreover variable length coded data and the position of the data on a screen and the position on a tape do not correspond, Since it is unreproducible for a long time, it is very hard to see a special reproduction picture as it is.

[0010]Then, when it reproduces by specific double speed, it secures in a track by setting to tPA the position which a rotary head certainly traces, i.e., the area which can read data, and I picture is recorded there as data for special reproduction. Creation of the data for special reproduction is performed at the same time it records the MPEG transport stream broadcast on NPA as it is.

[0011]Next, an MPEG transport stream is briefly explained using drawing 8. In an MPEG transport stream (MPEG-TS), it is possible to multiplex a sound, a character, etc. and to transmit the picture photographed with the program (program) of the various sorts sent from each broadcasting station or the camera of various sorts. The specification method of the program (program) in this MPEG-TS uses two steps of pointers as follows.

[0012]The program association table (PAT) in which first the packet recognition signal (PID) of transport of the transport packet shown in drawing 8 (A) is included in the packet which is PID=0 is referred to. In this table, as shown in drawing 8 (B), the table which associated PID of the transport packet containing each PMT (program map table) is indicated to be a program number which shows each program.

[0013]PMT is the table where information, including PID etc. of the packet containing PID and the clock of the transport packet to which the elementary stream (each streams, such as a picture, a sound, and text) of each program is transmitted, was indicated, as shown in drawing 8 (C). Therefore, if PAT reference is carried out and the program number of a desired program is specified, Next, with reference to PMT contained in PID of the program number, PID to which each elementary stream of the desired program is transmitted is obtained, and the picture of each program, a sound, text, etc. are acquired.

[0014]Next, the preparation device of the conventional data for special reproduction is explained with the block diagram of drawing 9. First, the case where a specific program is recorded is explained. Program draw circuit 12I supply of MPEG-TS inputted from the input terminal 11 is done, and the data of a specific program to record here is extracted. The data of this specific program is data which streams, such as a picture, a sound, and text, have multiplexed as it was described with the program acquiring method of the specification from the above-mentioned transport stream. Since the data of this specific program records on NPA as data for usually reproducing at a speed, it is once written in the NP buffer 13.

[0015]On the other hand to the data of the specific program extracted by the program draw circuit 12. Since streams, such as a picture, a sound, and text, have multiplexed as mentioned above, only an imaged stream is extracted by the imaged stream draw circuit 14, and a stream including only the picture signal of a specific program is outputted. After this imaged stream by which the draw was carried out is decrypted by the picture signal in the picture decoding circuit 15, it is once accumulated in the image memory 16. After accumulating in the image memory 16, the read image data is generated by the coding stream in the picture TP data creation circuit 17, and is written in the TP buffer 18 as data for special reproduction (TP data).
[0016]Each MPEG-TS of NP and TP written in the NP buffer 13 and the TP buffer 18 is read, respectively, is supplied to the track data creation circuit 19, and is changed into the format written in a recording medium here. The data by which formatting was carried out in the track data creation circuit 19 is recorded on the position of a recording medium.
[0017]When input data is a picture signal, a direct image signal is written in the image memory 16 from the terminal 10. The picture TP data creation circuit 17 takes out image data from the image memory 16 to predetermined timing. Subsequent processing is the same as what was mentioned above.
[0018]The field is limited and data area tPA for special reproduction needs to reduce the data volume per time at the time of record compared with the original image data quantity as it was mentioned above. For this reason, after extracting only I picture of image data generally, it codes so that it may become less than the data volume which can be written in tPA, and data volume is reduced.
[0019]The method of throwing away other I pictures as reduction methods only using some I pictures in I picture, the method of reducing the picture signal high-frequency components of I picture, the method of reconstructing an imaged stream and coding by MPEG again, etc. can be considered.
[0020]
[Problem(s) to be Solved by the Invention]Here, the amount of coding data of each picture [in / by the quantity of the high frequency component of a picture, the speed of a motion of a picture etc. / MPEG] is not constant. As for TP field, since recording ordinary reproduction on high definition is generally liked, much data volume is assigned and recorded on NP field, and it is desirable to be considered as a sufficiently small data area compared with NP field.
[0021]Therefore, in the above-mentioned conventional data creation device for special reproduction, data volume for special reproduction per [which is written in TP field] picture is made into very small data volume as compared with the MPEG data volume per picture of NP field. As a result, the picture (namely, special reproduction picture) of the MPEG stream of TP field is getting remarkably worse as compared with the picture (namely, ordinary reproduction picture) of the MPEG stream of NP field.
[0022]In order to improve a picture, lowering a picture update rate and increasing the code amount per picture is also considered, but when a picture update rate is low as a picture for carrying out image retrieval, there is a problem of being hard to search a scene.
[0023]This invention was made in view of the above point, and an object of this invention is to provide the data creation device for special reproduction which may raise the image quality of the data for special reproduction created when recording the MPEG-TS data transmitted on a recording medium.
[0024]Other purposes of this invention improve the image quality of the data for special reproduction, and there are in providing the data creation device for special reproduction which may raise image retrieval capability.

[0025]
[Means for Solving the Problem]A data creation device for special reproduction which creates data for special reproduction which should be reproduced with relative velocity between tape heads in which the 1st invention differs from the time of record from a tape shaped recording medium in order that this invention may attain the above-mentioned purpose in order to record on a tape shaped recording medium is characterized by comprising:
A decoding circuit which decodes coded image data by which compression encoding was carried out with an MPEG system.
An image-size-conversion means to change into the same or smallness image size of image data which used at least one of the data sizes of image size of coded image data inputted into a decoding circuit, an image update rate, and one picture, and was decoded by decoding circuit, and to determine an image update rate.
As opposed to image data from which image size was changed by an image-size-conversion means, . [whether coded image data for one frame which performs formation of a field inner code and forward direction prediction coding between the fields, respectively, and consists of two field coded image data is generated, and] Or the 1st encoding means that performs frame inner code-ization to image data from which image size was changed, and generates frame inner code-ized image data for one frame.
As opposed to coded image data which was generated by the 1st encoding means and taken out, The 2nd encoding means that is added to coded image data which carried out inter-frame forward direction prediction coding, generated a prediction-coding picture of N sheets (however, N one or more integers) of identical image information, was generated by the 1st encoding means, and was taken out, and is outputted as data for special reproduction.

[0026]From coded image data by which compression encoding was carried out with an inputted MPEG system in this invention. Image size is the same or performs image size conversion is changed into smallness and made it whose picture update rate increase, Data for special reproduction which consists of inside of the field, or coded image data and inter-frame forward direction prediction-coding image data of N sheets which were formed into the frame inner code can be created from image data after the image size conversion.
[0027]In order to attain the above-mentioned purpose, the 2nd invention, At least one of the activities computed in a calculation circuit which computes an activity of inputted image data, and image size of inputted image data, a picture update rate and a calculation circuit is used, Image size of inputted image data An image-size-conversion means same, to change into smallness and to determine a picture update rate, As opposed to image data from which image size was changed by an image-size-conversion means, . [whether coded image data for one frame which performs formation of a field inner code and forward direction prediction coding between the fields, respectively, and consists of two field coded image data is generated, and] Or the 1st encoding means that performs frame inner code-ization to image data from which image size was changed, and generates frame inner code-ized image data for one frame, As opposed to coded image data which was generated by the 1st encoding means and taken out, Carry out inter-frame forward direction prediction coding, and a prediction-coding picture of N sheets (however, N one or more integers) of identical image information is generated, It has composition which has the 2nd encoding means that is added to coded image data which was generated by the 1st encoding means

and taken out, and is outputted as data for special reproduction.
[0028]In this invention, image size is the same or is changed into smallness from inputted image data, And image size conversion made it whose picture update rate increase can be performed, and data for special reproduction which consists of inside of the field, or coded image data and inter-frame forward direction prediction-coding image data of N sheets which were formed into the frame inner code can be created from image data after the image size conversion.
[0029]In order to attain the above-mentioned purpose, the 3rd invention, Image size of image data decoded by decoding circuit using image size and an image update rate of coded image data into which an image-size-conversion means of the above-mentioned invention is inputted in a decoding circuit is changed into the same or smallness, And a picture update rate was determined and it had composition which performs image size conversion which gave the low-pass filter characteristic which changed a rate which intercepts a high-frequency component according to data size of one picture, and a product of a quantizing scale.
[0030]In order to attain the above-mentioned purpose, the 4th invention, Change image size of inputted image data into the same or smallness for an image-size-conversion means of the above-mentioned invention using image size and a picture update rate of inputted image data, determine a picture update rate, and. It had composition which performs image size conversion which gave the low-pass filter characteristic which changed a rate which intercepts a high-frequency component according to an activity computed in a calculation circuit.
[0031]Since the low-pass filter characteristic corresponding to a product of a scale or an activity only in data size and quantity of one picture is given as image data after image size conversion in the 3rd above-mentioned invention or invention of the 4th, A high-frequency component of picture information can lessen and, thereby, subsequent coding can be made easy.
[0032]In order to attain the above-mentioned purpose, the 5th invention, Image data changed into image size by an image-size-conversion means the 1st encoding means in the 1st or 2nd invention, When it detects that it is interlace structure based on the picture update rate, It has composition which generates and outputs coded image data for one frame which performs formation of a field inner code, and forward direction prediction coding between the fields, respectively, and consists of two field coded image data to image data from which image size was changed by an image-size-conversion means. Since he is trying to acquire a field inner code-ized picture (I picture) of the piece field when image data after image size conversion detects that it is an interlace picture, a code amount per pixel can be made to increase in this invention.
[0033]In order to attain the above-mentioned purpose, the 6th invention, It had composition which generates and outputs coded image data of the same coding structure as data for ordinary reproduction generated from image data before the 1st and 2nd above-mentioned encoding means are changed into image size by an image-size-conversion means. In this invention, when it is a progressive image, data for special reproduction used as a progressive image is outputted, and when image data after image size conversion is an interlace picture, it outputs data for special reproduction used as an interlace picture.
[0034]Here, since it is coded as data for ordinary reproduction, when it is intermingled and data for ordinary reproduction and data for special reproduction are recorded, the image data before the above-mentioned image size is changed can change image data of the same data structure, and can be reproduced.

[0035]
[Embodiment of the Invention]Next, the 1 embodiment of this invention is described with Drawings. Drawing 1 shows the block diagram of a 1st embodiment of the data creation device for special reproduction which becomes this invention. Identical codes are given to drawing 9 and an identical configuration portion among the figure. This embodiment has the feature in the point which added the picture information acquisition circuit 21, the image transformation filter setting device 22, and the image-size-conversion circuit 23 to the device conventionally which was shown in drawing 9.
[0036]In drawing 1, the data of a specific program to record MPEG-TS inputted via the input terminal 11 on by the program draw circuit 12 is extracted. Streams, such as a picture, a sound, and text, have multiplexed the data of this specific program to record, and in order to record on said NPA as data for usually reproducing at a speed, it is once written in the NP buffer 13.
[0037]On the other hand, the data for special reproduction (TP data) is simultaneously created as follows with the above-mentioned data for ordinary reproduction. To the data (transport stream) of the specific program outputted from the program draw circuit 12 to record. Since streams, such as a picture, a sound, and text, have multiplexed as mentioned above, only an imaged stream is extracted by the imaged stream draw circuit 14 out of the data, and a stream including only the picture signal of a specific program is outputted.
[0038]After the imaged stream of the specific program extracted by the imaged stream draw circuit 14 is decrypted by image data in the picture decoding circuit 15, it is accumulated in the image memory 16. The picture information acquisition circuit 21 acquires the size of the picture of the imaged stream at the time of the picture decoding circuit 15 decrypting an inputted image stream in every direction and a picture update rate (frame rate), and the data size of one picture from the picture decoding circuit 15. Since the size in every direction and the picture update rate of the picture are described by the header of the MPEG imaged stream, by detecting it, those information is acquired, and the data size of one picture is measured and obtained in the picture decoding circuit 15.
[0039]The size of the above-mentioned picture acquired by the picture information acquisition circuit 15 in every direction, a picture update rate, and the data size of one picture are supplied to the image transformation filter setting device 22, and make the filter factor according to them set up here. As for the image data of the specific program accumulated in the image memory 16, according to Table 1, image size is changed in the image-size-conversion circuit 23 using the filter factor from the image transformation filter setting device 22.
[0040]
[Table 1]

As shown in Table 1, as compared with inputted image size, TP image size is made small, and it is set up so that resolution may become low. Although the size of an inputted image in every direction, the size of TP picture which will be outputted if a picture update rate is decided in every direction, and a picture update rate become settled uniquely and image size conversion is performed in Table 1, According to this embodiment, signal processing of TP image data in which image size conversion was carried out by the filter factor which was determined based on the data size of one picture in addition to this is also performed simultaneously.

[0041]Namely, since it becomes the decoded image included the high-frequency component so that the product of input coded image data size and a quantizing scale is large, The coding at the time of TP picture creation is difficult, and the filter factor from the image transformation filter setting device 22 used for the above-mentioned image transformation is set as the value in consideration of the LPF (low-pass filter) characteristic which intercepts the high-frequency component of an inputted image. For example, the filter factor to which a picture becomes soft is set up, so that the product of input coded image data size and a quantizing scale is large. It has two or more filter factors, and may be made to change a filter factor by the image quality of TP picture made profitably like at this time.

[0042]The image data after conversion of the image size by the image-size-conversion circuit 23 is supplied to the picture TP data creation circuit 24 with the data size of the size of the inputted image acquired in the picture information acquisition circuit 21 in every direction, a picture update rate, and one picture, and is created as final TP image data here.

[0043]Next, the composition and operation of this picture TP data creation circuit 24 are explained in detail with the block diagram of drawing 2. In drawing 2, the image data inputted into the picture TP creation circuit 24 from the image-size-conversion circuit 23 is once stored in the image memory 241. To the image data stored in the image memory 241 with the control signal outputted by the TP format controller 246 based on the size of the picture from the picture information acquisition circuit 21 in every direction, and a picture update rate. The addition number of sheets of p frames, etc. are determined [whether the code amount broken and given to I picture and P field are added, and].

[0044]Namely, the image data read from the image memory 241, Only the piece field (1 field) is formed

into a field inner code according to the target code quantity and coding structure which are set up based on the control signal which is first supplied to I picture encoding circuit 242, and is supplied by the TP format controller 246 here. It adjusts so that invalid data may be added and it may become target code quantity, in not reaching target code quantity.

[0045]About selection of whether to make coding structure into interlace structure or progressive structure, it chooses to be in agreement with the coding structure of NP transport stream stored in the NP buffer 13. Because, if coding structure is not unified, when changing from ordinary reproduction to special reproduction, it is for reset to take depending on a display at the time of a change, and for display switching to take time.

[0046]P field addition machine 243 generates and adds P field coding stream (P picture of the 1 field), only when the coding structure of the coding data inputted from I picture encoding circuit 242 is interlace structure. Here, in the coding structure of input coding data, the TP format controller 246 judges progressive structure or interlace structure. Specifically, the inputted image whose inputted images whose TP picture update rates are 60 fields / second in Table 1 are an interlace picture and 60 frames per second is a progressive image.

[0047]P field addition machine 243 the size of TP picture created when NP picture update rates are 60 fields / second, as shown in Table 1, Since it is two kinds, 352x480 and 1440x1088, these two kinds of P fields (352x240, 1440x544) have been created beforehand, When it judges that input coding data is interlace structure based on the control signal from the TP format controller 246 (when an inputted image is an interlace picture), It adds and outputs to I picture which is coding data of the 1 field which chooses one side of two kinds of these created P fields according to TP image size at that time, and is inputted from I picture encoding circuit 242. P field to create adds data which serves as the same picture as I picture.

[0048]On the other hand, at the time of a progressive image, I picture encoding circuit 242 is controlled based on the control signal from the TP format controller 246 to generate I picture of one frame from input coding data, and. P field addition machine 243 passes the coding data (I picture of one frame) inputted from I picture encoding circuit 242 as it is. That is, at the time of a progressive image, the above-mentioned P field addition machine 243 is not used.

[0049]Thus, in this embodiment, since I picture encoding of only the piece field can be performed by P picture of the 1 field being added with P field addition machine 243 at the time of an interlace picture, the code amount per pixel is increased.

[0050]The coding data outputted from P field addition machine 243 is supplied to the p-frames addition machine 244. The p-frames addition machine 244 has created beforehand P picture of all the TP image sizes (352x480, 720x480, 1280x720, 1440x1088) created in Table 1, P-frames coding data (P picture) in which it is the image size of 1 selected corresponding to the image size of the coding data inputted from P field addition machine 243, and the same picture as the picture of the coding data is outputted is added.

[0051]In the special reproduction which displays a discontinuous picture, since a picture cannot be recognized if several same pictures are not outputted, the number of P pictures which add the frame number determined by the TP format controller 246 with the p-frames addition machine 244 realizes. This frame number (the number of P pictures) to add is set up by the size of a picture, and a picture update rate. For example, since TP image size also becomes large and a code amount is needed so that

the image size of an input encoding data stream is large, the number of P pictures to add is increased. The code amount which I picture can give can be increased by that.

[0052]Thus, from the p-frames addition machine 244. When an inputted image is an interlace picture, I picture of the piece field, The image coding stream by which P picture (P field) of the 1 field and P picture of one frame were compounded serially [N sheets (N is one or more integers)] one by one is taken out, When an inputted image is a progressive image, the image coding stream by which P picture of one frame was compounded serially [N sheets (N is one or more integers)] by I picture of one frame is taken out. P picture is inter-frame forward direction prediction-coding image data, and since it is obtained by coding an error value with a front image comparison, the data size of itself is smallness very much compared with I picture. For this reason, even if it adds P picture of N sheets to I picture, recording on narrow tPA is possible.

[0053]After the multiplexing machine's 245 having carried out multiplex [of the information required for the above-mentioned image coding stream taken out from the p-frames addition machine 244], having supplied it to the TP buffer 18 of drawing 1 as MPEG-TS of TP picture which is data for special reproduction and making it accumulate here temporarily, The track data creation circuit 19 is supplied. The track data creation circuit 19 performs formatting of a recording medium to MPEG-TS of NP picture from the NP buffer 13, and MPEG-TS of TP picture from the TP buffer 18, respectively, and outputs it to a recording-medium record circuit to predetermined timing. Thereby, when a recording medium is magnetic tape, the tape pattern shown in drawing 6 and drawing 7 and the same tape pattern are formed.

[0054]However, the data for special reproduction recorded on the data area (tPA) for special reproduction in this embodiment, It is TP image data created by drawing 1, and the case of an interlace picture can make the code amount per pixel increase by obtaining I picture of the piece field, Since an unnatural block noise peculiar to MPEG and a mosquito noise are reduced, compared with the former, image quality can be improved on vision. Since he is trying for the picture update rate of data of this embodiment for special reproduction to increase in any [of an interlace picture and a progressive image] case, it can be made easy to search.

[0055]Next, a 2nd embodiment of this invention is described. Drawing 3 shows the block diagram of a 2nd embodiment of the data creation device for special reproduction which becomes this invention. Identical codes are given to drawing 1 and an identical configuration portion among the figure, and the explanation is omitted. Unlike a 1st embodiment, a 2nd embodiment shown in drawing 3 has the feature in the point which creates the data for special reproduction which took the activity value into consideration from the image data which decoded the MPEG video data instead of MPEG-TS.

[0056]In drawing 3, after the image data inputted via the input terminal 30 is supplied and stored temporarily at the image memory 31, it is supplied to the activity calculation circuit 32 and the image coding circuits 33. To inputted image data, the image coding circuits 33 perform compression encoding by a publicly known MPEG system, generate an MPEG video data, and output it to the NP buffer 13 as data for ordinary reproduction.

[0057]On the other hand, the activity calculation circuit 32 asks for the activity (picture complexity) of an adjacent pixel difference value absolutely computable in the peace sum total etc. Although various kinds of calculating methods are known about the activity, which calculating method may be adopted. The activity value computed by the activity calculation circuit 32 is inputted into the picture information

acquisition circuit 35.
[0058]The size of the picture acquired from the MPEG header when the picture information acquisition circuit 35 decrypted an MPEG video data by the decoding circuit (not shown) which obtains the image data supplied to the image memory 31 like a 1st embodiment besides this activity value in every direction, The information on a picture update rate (frame rate) is inputted, and the data size of one picture is measured. The image transformation filter setting device 36 sets up a filter factor from size in every direction, a picture update rate, etc. of Table 1, the activity value which is the dynamic image information from the picture information acquisition circuit 35, and a picture.
[0059]The image-size-conversion circuit 37 changes the size of the image data from the image memory 31 based on Table 1 based on the filter factor from the image transformation filter setting device 36. Here, since there are many high frequency components of picture information and coding is so difficult that an activity value is large, the filter factor used for image transformation is set up perform simultaneously with the above-mentioned image size conversion operation which intercepts the high-frequency component of picture information with a low-pass filter (LPF).
[0060]For example, in the image-size-conversion circuit 37, it faces performing image size conversion, To the pixel value of (126, 180,123,156,125) in the image data from the image memory 31, when an activity value is high, The pixel value which gives the low-pass filter characteristic of (1, 2, 1) / 4 of three taps so that a picture may fade considerably (104, 152,146,140,102) is acquired. When an activity value is common, so that a picture may fade for a while for example, Acquire the pixel value which gives the low-pass filter characteristic of (1, 3, 1) / 5 of three taps (106, 158,141,143,106), and when an activity value is low, The same pixel value as the input which gives the low-pass filter characteristic of (0, 1, 0) / 1 of three taps so that a picture may be left intact (126, 180,123,156,125) is acquired. It may be made to change with image size and an activity value with [two or more] a filter factor.
[0061]The image data after conversion of the image size by the image-size-conversion circuit 23, The picture TP data creation circuit 24 is supplied with the data size of the size of the inputted image acquired in the picture information acquisition circuit 35 in every direction, a picture update rate, and one picture, and it is created as TP image data by the same operation as a 1st embodiment here.
[0062]The grant of the low-pass filter characteristic according to an activity value, It is not what is restricted to carrying out simultaneous when using a size conversion filter in image-size-conversion circuit 37 inside explained above, For example, it may be made to provide into the signal path from the image-size-conversion circuit 37 to the picture TP data creation circuit 24, or the signal path from the image memory 31 to the image-size-conversion circuit 37.
[0063]This invention is not limited to an above embodiment and creation of the data for special reproduction is faced it, for example, Even if not based on all the data sizes of the image size of input video coding data in every direction, a picture update rate, and one picture, or picture activities, any one is used and it may be made to determine the image size and the picture update rate of the data for special reproduction. For example, the image size does not need to detect the image size of input coding data in every direction, when it is made to change into the minimum image size assumed fixed.
[0064]
[Effect of the Invention]As opposed to the coded image data by which compression encoding was carried out with the MPEG system according to this invention as explained above, or the decoded image data, Image size is the same or performs image size conversion is changed into smallness and made it

whose picture update rate increase, Since the data for special reproduction which consists of inside of the field, or the coded image data and the inter-frame forward direction prediction-coding image data of N sheets which were formed into the frame inner code was created from the image data after the image size conversion, creation of the image data for special reproduction with easy search can be performed after record.

[0065]By acquiring the field inner code-ized picture (I picture) of the piece field, when the image data after image size conversion detects that it is an interlace picture according to this invention, Since it was made to make the code amount per pixel increase, an unnatural block noise peculiar to an MPEG system and a mosquito noise can be reduced, and, therefore, image quality can be improved on vision.

[0066]According to this invention, the coding structure of the data for special reproduction having made it in agreement with the coding structure of the data for ordinary reproduction A sake, At the time of reproduction of the recording medium which intermingled for it and recorded the data for special reproduction on the data for ordinary reproduction, the reset produced for ordinary reproduction and special reproduction to change is prevented, and the display switching time of a display can be shortened.

[Translation done.]

* NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

CLAIMS

[Claim(s)]

[Claim 1]A data creation device for special reproduction which creates data for special reproduction which should be reproduced with different relative velocity between tape heads from the time of record characterized by comprising the following from a tape shaped recording medium in order to record on said tape shaped recording medium.

A decoding circuit which decodes coded image data by which compression encoding was carried out with an MPEG system.

An image-size-conversion means to change into the same or smallness image size of image data which used at least one of the data sizes of image size of said coded image data inputted into said decoding circuit, an image update rate, and one picture, and was decoded by said decoding circuit, and to determine an image update rate.
As opposed to image data from which image size was changed by said image-size-conversion means, . [whether coded image data for one frame which performs formation of a field inner code and forward direction prediction coding between the fields, respectively, and consists of two field coded image data is generated, and] Or the 1st encoding means that performs frame inner code-ization to image data from which said image size was changed, and generates frame inner code-ized image data for one frame.
As opposed to coded image data which was generated by said 1st encoding means and taken out, The 2nd encoding means that is added to coded image data which carried out inter-frame forward direction prediction coding, generated a prediction-coding picture of N sheets (however, N one or more integers) of identical image information, was generated by said 1st encoding means, and was taken out, and is outputted as said data for special reproduction.

[Claim 2]In a data creation device for special reproduction which creates data for special reproduction which should be reproduced with relative velocity between tape heads which is different from the time of record from a tape shaped recording medium in order to record on said tape shaped recording medium, At least one of said the activities computed in a calculation circuit which computes an activity of inputted image data, and image size of said inputted image data, a picture update rate and said calculation circuit is used, Image size of said inputted image data An image-size-conversion means same, to change into smallness and to determine a picture update rate, As opposed to image data from which image size was changed by said image-size-conversion means, . [whether coded image data for one frame which performs formation of a field inner code and forward direction prediction coding between the fields, respectively, and consists of two field coded image data is generated, and] Or the 1st encoding means that performs frame inner code-ization to image data from which said image size was changed, and generates frame inner code-ized image data for one frame, To coded image data which was generated by said 1st encoding means and taken out, carry out inter-frame forward direction prediction coding, and a prediction-coding picture of N sheets (however, N one or more integers) of identical image information is generated, A data creation device for special reproduction having the 2nd encoding means that is added to coded image data which was generated by said 1st encoding means and taken out, and is outputted as said data for special reproduction.
[Claim 3]Said image-size-conversion means changes into the same or smallness image size of image data decoded by said decoding circuit using image size and an image update rate of said coded image data inputted into said decoding circuit, And the data creation device for special reproduction according to claim 1 determining a picture update rate and performing image size conversion which gave the low-pass filter characteristic which changed a rate which intercepts a high-frequency component according to data size of said one picture, and a product of a quantizing scale.
[Claim 4]Said image-size-conversion means changes image size of said inputted image data into the same or smallness using image size and a picture update rate of said inputted image data, determines a picture update rate, and. The data creation device for special reproduction according to claim 2

performing image size conversion which gave the low-pass filter characteristic which changed a rate which intercepts a high-frequency component according to said activity computed in said calculation circuit.

[Claim 5]When image data from which image size was changed by said image-size-conversion means detects that it is interlace structure based on the picture update rate, said 1st encoding means, As opposed to image data from which image size was changed by said image-size-conversion means, It is a data creation device for special reproduction given in any 1 paragraph among Claims 1-4 generating and outputting coded image data for one frame which performs formation of a field inner code, and forward direction prediction coding between the fields, respectively, and consists of two field coded image data.

[Claim 6]Said 1st and 2nd encoding means, It is a data creation device for special reproduction given in any 1 paragraph among Claims 1-4 generating and outputting coded image data of the same coding structure as data for ordinary reproduction generated from image data before image size is changed by said image-size-conversion means.

[Translation done.]

* NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.

2.**** shows the word which can not be translated.

3.In the drawings, any words are not translated.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1]It is a block diagram of a 1st embodiment of this invention.

[Drawing 2]It is a block diagram of the 1 embodiment of the picture TP data creation circuit in drawing 1.

[Drawing 3]It is a block diagram of a 2nd embodiment of this invention.

[Drawing 4]It is a figure showing the kind of MPEG picture, etc.

[Drawing 5]It is a block diagram of an example of the coding circuit of I picture.

[Drawing 6]It is a recording format of digital VCR.

[Drawing 7]It is an image data area of digital VCR.

[Drawing 8]It is a figure explaining an MPEG transport stream.

[Drawing 9]It is a block diagram of an example of a device conventionally.

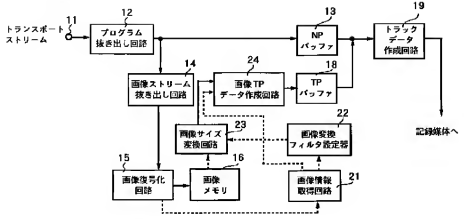
[Description of Notations]

11 MPEG transport stream input terminal
12 Program draw circuit
13 NP buffer
14 Imaged stream draw circuit
15 Picture decoding circuit
16, 31, 241 image memories
18 TP buffer
19 Track data creation circuit
21 and 35 Picture information acquisition circuit
22 and 36 Image transformation filter setting device
23, 37 image-size-conversion circuits
24 Picture TP data creation circuit
242 I picture encoding circuit
243 P field addition machine
244 P-frames addition machine
245 Multiplexing machine
246 TP format controller
32 Activity calculation circuit
33 Image coding circuits

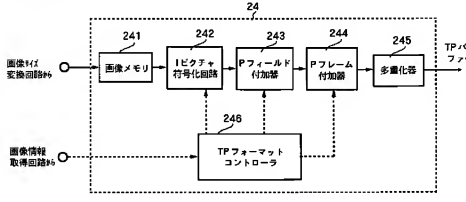
[Translation done.]

DRAWINGS

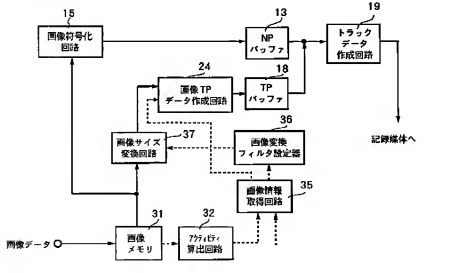
[Drawing 1]



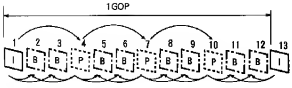
[Drawing 2]



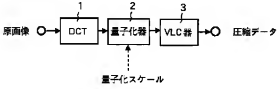
[Drawing 3]



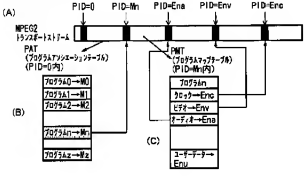
[Drawing 4]



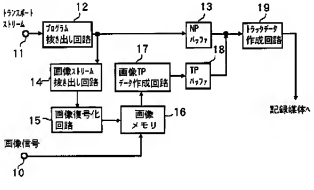
[Drawing 5]



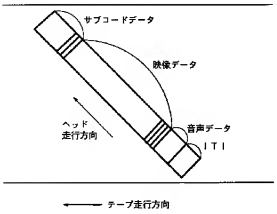
[Drawing 8]



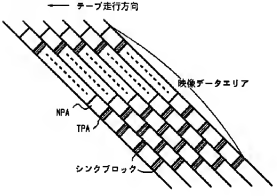
[Drawing 9]



[Drawing 6]



[Drawing 7]



[Translation done.]